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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application

Inventors: Kuniyuki KAJITA Art Unit: 2681

Application No.: 09/701,433

Filed: November 29, 2000

For: RADIO COMMUNICATION APPARATUS AND CODING PROCESSING METHOD

PETITION TO MAKE SPECIAL

Assistant Commissioner of Patents
Washington, DC 20231

URGENT

Sir:

The Applicants respectfully petition that the above-captioned application be granted special status. The requirements of MPEP section 708.02(VIII) are complied with as follows:

(1) Please charge the petition fee set forth in 37 CFR 1.17(i) to Deposit Account No. 19-4375.

(2) All pending claims (claims 11-20 submitted in a Preliminary Amendment filed herewith) of the present application are believed to be directed to a single invention; if the Office determines that all the claims presented are not obviously directed to a single invention, the Applicants agree to make an election without traverse as a prerequisite to the grant of special status.

(3) A pre-examination search has been made, and an Information Disclosure Statement directed thereto is attached. The field of search is:

Class 714, subclasses 701, 703, 704, 752, 758 and 776.

Class 375, subclasses 346, 347, 295 and 296.

Examiners Albert Decady and Stephen Baker were consulted for the field of search.

In addition, further pre-examination searches are based on the PCT International Search, and the searches in the corresponding Japanese and Chinese applications, the results of which are of record in the form of Information Disclosure Statements filed November 29, 2000 and September 2, 2003.

(4) One copy each of the prior art deemed most closely related to the subject matter encompassed by the claims is of record in the form of the art cited in the Information Disclosure Statements filed November 29, 2000 and September 2, 2003, and in the enclosed Information Disclosure Statement, submitted herewith.

(5) The following is a detailed discussion of the art cited in the above-mentioned Information Disclosure Statements, and comments pointing out how the instant claimed subject matter is patentably distinguishable thereover.

The present application has a PCT International filing date of March 23, 2000 and a Japanese priority date of March 31, 1999.

US6397367 discloses a channel coding device in which a bit inserter inserts known bits in an input data bit stream at predetermined positions. A channel coder codes the bit-inserted

data bit stream to generate coded symbols. A rate matcher matches a rate of the coded symbols to a given channel symbol rate. A channel interleaver interleaves the rate matched channel symbols. The rate matcher includes a puncturer for puncturing the inserted known bits included in the coded symbols, when the coded symbol rate is higher than the given channel symbol rate. The rate matcher includes a repeater for repeating the coded symbols to match the coded symbol rate to the given channel symbol rate, when the coded symbol rate is lower than the given channel symbol rate.

US5687095 discloses video transmission rate matching for multimedia communication systems wherein a bit stream rate matching apparatus useful in the context of a multimedia conference where a first endpoint device employs the first transmission rate and a second endpoint device employs the second transmission rate. The appratus (1) converts a video bit stream having a first transmission rate to a video bit stream having a second transmission rate wherein the first transmission rate is less than the second transmission rate and (2) converts a video bit stream having the second transmission rate to a video bit stream having the first transmission rate.

WO9314588A1 (Category X in the PCT International Search) discloses a CDMA transmission data formatting technique wherein as described at page 18, lines 16-21, infomration is encoded using a

rate 1/3 convolutional encoder and the code symbols are repeated by a factor of 1, 2, 4 or 8 for different data rates. The resulting code symbol rate is thus fixed. This data stream is interleaved.

WO9200639A1 (Category A in the PCT International Search) discloses generation of signal waveforms in a CDMA cellular telephone system using orthogonal PN codes. Information communicated on the cell-to-mobile link channels are, in general, encoded, interleaved, bi-phase shift key (BPSK) modulated with orthogonal covering of each BPSK symbol along with quadrature phase shift key (QPSK) spreading of the covered symbols. In the mobile-to-cell link, access and voice channels are defined. Information communicated on the mobile-to-cell link channels are, in general, encoded, interleaved, orthogonal signalling along with QPSK spreading. Fig. 12 shows a symbol burst transmission pattern.

3GPP TS 25.212 v1.1.0 (1999-06) discloses in section 4.2.4 first interleaving and in section 4.2.6 rate matching before or after the first interleaving, applying repetition and puncturing.

JP10210016 and its correspondent US5983382 disclose ARQ functions in a communication system. A first convolutional encoder operating at a first rate generates an inner code including multiple encoded packets that are interleaved and applied to a second convolutional encoder operating at a second rate which generates an outer code including a transmit packet generated from

each of the encoded packets. A first transmit packet is decoded at the receiver in a Viterbi decoder operating at the second rate to generate a decoded version of the first transmit packet. The decoded version is inverted to provide a first provisional decoding of the input packet. If a CRC check thereof is passed, an ACK signal is sent to the transmitter; no retransmission is required. If the CRC check is not passed, retransmission is required and the transmitter sends one or more additional transmit packets, which are processed to generate one or more additional provisional decodings. If a CRC check of one of these additional provisional decodings is passed, the receiver sends an ACK signal. If none pass the CRC check, the receiver combines decoded versions of the transmit packets, and generates another provisional decoding, and this provisional decoding is subjected to a CRC check.

WO9953628A3 corresponds to JPH11551218 and discloses a data transmission method wherein over the physical channel, a transmitter transmits at least two signals (SIGN 1 - SIGN P) having differing quality requirements when received, and the transmitter changes, if necessary, the symbol rates of the signals (SIGN 1 - SIGN P) signal-specifically by a coder in order to meet quality requirements.

JP11275055A2 and CN 1243363A disclose a transmission rate estimation system wherein received first data is processed by

sequentially using each transmission rate. Based on comparison of polarity information of a prescribed number of the first data every transmission rate, second data is generated, and a first dissident number is detected. Decoded data are generated from the second data through Viterbi decoding to detect a maximum likelihood path metric value. A second dissident number is detected by comparing polarity information of coded data which results from convolution-coding decoded data corresponding to the second data and the second data for detecting a second dissident number, a corrected first dissident number, a corrected path metric value and a corrected second dissident number are simply compared by estimating a transmission rate based on the first dissident number, the path metric value and the second dissident number detected for each transmission rate. Thus, the system estimates the transmission rate with high accuracy, while discriminating properly whether or not the Viterbi decoding is correctly conducted.

JP11275056A2 and CN 1243363A disclose transmission rate estimation received first data is processed by sequentially using each transmission rate, polarity information of a prescribed number of first data is compared with each transmission rate to generate second data, and a first dissident number is detected, decoded data are generated from second data through Viterbi decoding to detect a maximum likelihood path metric value and a final state number. A

second dissident number is detected by comparing the polarity information of coded data, resulting from convolution-coding decoded data corresponding to the second data and the second data to detect a second dissident number. A transmitter rate is estimated by the use of corrected values of the first dissident number, the path metric value and the second dissident number detected with each transmission rate and an inter-code distance from a state number, depending on a tail bit until a final state number.

JP2000004220A2 discloses a mobile communication techinque wherein a super frame S is composed of data for nine basic frames F. A non-coded synchronous sequence A is added to the head, and a similar synchronous sequence B is added to the head of respective basic frames. The mobile reception circuit first detects the synchronous sequence A and afterwards the super frame S is received. Then, the decoding processing is performed and the control information is obtained.

By contrast to the disclosures above, Applicants recite in claim 11 a radio transmission apparatus comprising an interleaver that performs interleaving of input data including a plurality of bits to generate interleaved data; a rate matcher that performs adjustment of a data length of said interleaved data by increasing or decreasing the bits in the interleaved data to provide data

length adjusted data; and a transmitter that transmits the data length adjusted data adjusted by said rate matcher.

Dependent claim 12 depends from claim 11 and further recites a coder that performs error correction coding of said input data to provide error correction coded data, wherein, after said error correction coding by said coder, said interleaver performs the interleaving of the error correction coded data prior to said adjustment by said rate matcher. Claim 13 depends from claim 11 and recites that the rate matcher increases or decreases the bits in the interleaved data at regular intervals to provide said data length adjusted data.

Claim 14 is directed to a radio reception apparatus comprising a receiver that receives data including a plurality of bits and transmitted from the radio transmission apparatus of claim 13; a rate matcher that performs data length adjustment by increasing bits decreased in said radio transmission apparatus or decreasing bits increased in said radio transmission apparatus to provide data length adjusted data; and a deinterleaver that performs deinterleaving of the data length adjusted data provided by said rate matcher of said radio reception apparatus, in accordance with the interleaving performed in said radio transmission apparatus.

Claim 15 defines a communication terminal apparatus comprising the radio transmission apparatus of claim 11.

Claim 16 defines a communication terminal apparatus comprising the radio reception apparatus of claim 14.

Claim 17 defines a base station apparatus comprising the radio transmission apparatus of claim 11.

Claim 18 defines a communication terminal apparatus comprising the radio reception apparatus of claim 14.

Independent claim 19 defines a radio transmission method comprising (a) performing interleaving of input data including a plurality of bits to generate interleaved data; (b) performing adjustment of a data length of said interleaved data by increasing or decreasing the bits in the interleaved data to provide data length adjusted data; and (c) transmitting the data length adjusted data adjusted in step (b).

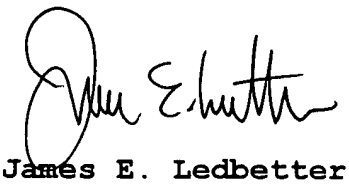
Claim 20 defines a radio reception method comprising (a) receiving data including a plurality of bits and transmitted from a radio transmission apparatus employing the radio transmission method of claim 19; (b) performing data length adjustment by increasing bits decreased in said radio transmission apparatus or decreasing bits increased in said radio transmission apparatus to provide data length adjusted data; and (c) performing deinterleaving of the data length adjusted data provided in step (b), in accordance with the interleaving performed in said radio transmission apparatus.

The references cited above, either alone or in combination, fail to disclose or suggest the claimed combination of interleaving of input data, rate matching that adjusts a data length of the interleaved data by increasing or decreasing the number of bits, and then transmission of the rate adjusted data.

Applicants submit that the references discussed herein, considered alone or in combination, fail to disclose or suggest the claimed subject matter. Therefore, in light of the foregoing discussion pointing out how the claimed invention distinguishes over these references, Applicants respectfully submit that the inventions of independent claims 11-20 are not anticipated by these references and would not have been obvious over any combination thereof.

Grant of special status in accordance with this petition is respectfully requested.

Respectfully submitted,



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